

- LINSLEY, E. G. 1961. The Cerambycidae of North America. Part I. Univ. Calif. Publ. Entomol., 18: 1-135, 35 pl., figs. 1-16.
1962. The Cerambycidae of North America. Part III. Taxonomy and classification of the subfamily Cerambycinae, tribes Opsimini through Megaderini. Univ. Calif. Publ. Entomol., 20: 1-188, figs. 1-56.
- MICHELSSEN, A. 1963. Observations on the sexual behaviour of some longicorn beetles, subfamily Lepturinae. Behaviour, 22: 151-166.
- 1966a. On the evolution of tactile stimulatory actions in longhorned beetles. Z. Tierpsychol., 23(3): 257-266.
- 1966b. The sexual behaviour of some longhorned beetles. Entomol. Medd., 34: 329-355.
- MUNZ, P. A., AND D. D. KECK. 1959. A California flora. Univ. Calif. Press, Berkeley and Los Angeles, 1-1681, figs. 1-134.

Two New Scorpions from Western North America

(Scorpionida : Vejovidae)

STANLEY C. WILLIAMS
San Francisco State College, California

Vejovis utahensis Williams, new species

(Figs. 1, 2)

DIAGNOSIS.—Moderate to large species of *Vejovis*, belonging to subgenus *Paruroctonus*. Body uniform straw yellow, pedipalps and walking legs somewhat lighter, pectines whitish; lacking stripes and other contrasting markings on dorsum. Pedipalp hands with palms swollen, strongly granular keels and short fingers. Metasoma with inferior lateral keels present and serrate; inferior median keels smooth to obsolete on segment I, smooth to crenulate on II and III, crenulate to serrate on IV. Pectines with 27 to 31 teeth in males, 17 to 21 teeth in females.

Vejovis utahensis appears related to *Vejovis mesaensis* (Stahnke), *Vejovis auratus* (Gertsch and Soleglad), and *Vejovis aquilonalis* Stahnke because of similarities in the following characteristics: short pedipalp fingers; terminal teeth of movable finger of chelicerae subequal on both borders; light yellow body coloration essentially lacking distinctive dark markings; basic pectinal structure similar. Differs from *V. mesaensis* in the following ways: ocular diad not $\frac{1}{3}$ carapace width; bristles on inferior surface of metasoma not as numerous; pectinal teeth fewer; structure of inferior keels of metasoma not similar. Differs from *V. aquilonalis* and *V. auratus* in the following ways: inferior median keels of metasoma not all obsolete on segments I to IV; inferior lateral keels not weak and smooth on segments I to IV.

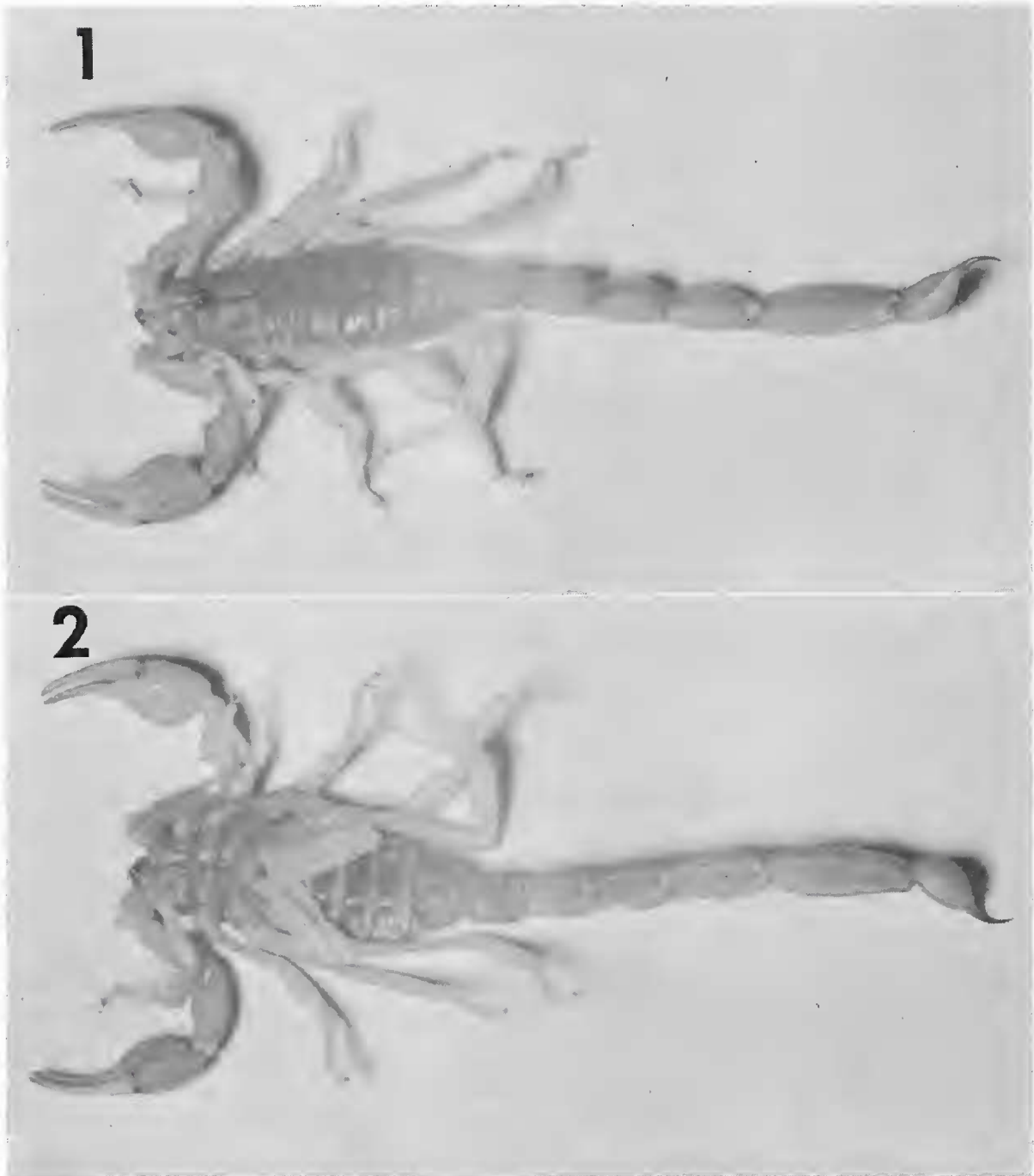


FIG. 1. *Vejovis utahensis* Williams, new species. Dorsal view of holotype.
 FIG. 2. *Vejovis utahensis* Williams, new species. Ventral view of holotype.

HOLOTYPE MALE.—*Coloration*.—Carapace, mesosoma, metasoma and pedipalps uniform, pale, straw yellow except for obsolescent dusky marking associated with median groove of carapace; walking legs similar but lighter yellow; pectines whitish. Only contrasting color markings are: eyes black, most of ocular tubercule black, pedipalp and cheliceral teeth reddish-amber, aculeus and pretarsal claws reddish-brown. Cuticle almost transparent, with heart showing dorsally; internal organs give mesosoma darker tone; cuticle otherwise unpigmented.

Carapace.—Anterior margin somewhat convex, with subtle median emargination, set with eight reddish bristles. Lateral eyes three per group, most anterior eye in each group largest. Median eyes on raised ocular tubercule; one large reddish bristle on ocular tubercule posterior to each median eye; diad slightly more than

TABLE 1. Measurements (in millimeters) of *Vejovis utahensis*, new species, holotype and allotype.

| | Holotype (male) | Allotype (female) |
|-----------------------------|--------------------|----------------------|
| Total length | 42.0 | 54.3 |
| Carapace, length | 5.3 | 6.2 |
| width (at median eyes) | 3.9 | 4.5 |
| Mesosoma, length | 9.6 | 17.8 |
| Metasoma, length | 21.3 | 23.0 |
| segment I, length/width | 2.9/2.7 | 3.0/3.1 |
| segment II, length/width | 3.4/2.6 | 3.7/3.0 |
| segment III, length/width | 3.6/2.4 | 3.9/2.9 |
| segment IV, length/width | 4.6/2.3 | 5.0/2.6 |
| segment V, length/width | 6.8/2.2 | 7.4/2.6 |
| Telson, length | 5.8 | 7.3 |
| Vesicle, length/width | 3.7/2.0 | 4.8/2.6 |
| depth | 1.7 | 2.3 |
| Aculeus, length | 2.1 | 2.5 |
| Pedipalp | | |
| Humerus, length/width | 4.2/1.5 | 4.8/1.8 |
| Brachium, length/width | 4.7/2.0 | 5.3/2.4 |
| Chela, total length | 8.3 | 9.3 |
| Palm, length/width | 4.5/2.4 | 4.8/2.5 |
| depth | 3.5 | 3.6 |
| Fixed finger, length | 3.8 | 4.5 |
| Movable finger, length | 4.8 | 5.6 |
| Pectines, teeth, left/right | 31/30 | 18/17 |
| middle lamellae | 23 | 14 |

$\frac{1}{4}$ carapace width at that point. Carapace surface densely covered with large granules, parts of ocular tubercule also granular.

Mesosoma.—All tergites densely granular; median keels absent on tergite 1, granular to serrate on 2 to 7; tergite 7 with two pairs of dentate lateral keels. Sternites smooth; one pair of serrate keels on last sternite.

Metasoma.—Lateral keels present and serrate on posterior $\frac{5}{6}$ of segment I, represented by 4 to 5 serrations on posterior $\frac{1}{6}$ of segments II and III, reduced to a single posterior granule on IV, crenulate to serrate on anterior half of V. Inferior lateral keels present and serrate on all segments. Inferior median keels smooth to obsolete on segment I, smooth to crenulate on II and III, crenulate to serrate on IV, serrate on V. Inferior median keels set with reddish bristles, 3, 4, 4, 5, pairs on segments I to IV, respectively. Inferior intercarinal spaces of segment V with abundant moderate-sized granules.

Telson.—Ventral side with 9 pairs of long reddish hairs; vesicle basically smooth and lustrous but with irregular surface; subtle subaculear tubercule.

Pectines.—23 subcircular middle lamellae in a single row, each with 4 to 7 reddish hairs; about five accessory middle lamellae anterior to the middle row; 31/30 teeth; 7 to 9 reddish hairs on each fulcrum.

Genital Operculum.—Completely divided longitudinally; genital papillae visible externally.

Chelicerae.—Inferior border of movable finger crenulate and with four, subtle, unpigmented denticles; terminal tooth of superior border of movable finger smaller than that of inferior border, but these two closely opposed.

Pedipalps.—Palm of chela well swollen inwardly, keels pronounced and heavily granular. Fixed finger, movable finger or palm each distinctly shorter than carapace length; fixed finger shorter than palm. Internal margin of finger irregularly scalloped.

Standard Measurements.—Table 1.

ALLOTYPE FEMALE.—Distinctly larger than holotype, but morphologically similar with following exceptions: pedipalp fingers more elongate; pectines with fewer teeth (18/17 instead of 31/30); middle lamellae fewer (14 instead of 23); with faint dusky pigment underlying carapace; carapace and tergites not as granular; cuticle lustrous in many areas; pectines smaller in size, no genital papillae, genital operculum not completely divided longitudinally.

Standard Measurements.—Table 1.

Study of 30 paratopotypes indicated little significant variation from the holotype and allotype. Twelve males varied in carapace length from 1.8 to 5.3 mm, while 18 females varied from 2.8 to 5.8 mm, in length. Pectine tooth count varied from 27 to 31 in males and from 17 to 21 in females. One specimen, an adult female, had median eyes and ocular tubercule completely lacking black pigment, and one juvenile male, presumably a second instar had faint dusky pigment underlining the inferior keels of the metasoma. Several specimens showed a suggestion of diffuse dusky pigment associated with the carapace and with the inferior metasomal keels.

The *holotype male*, allotype and 30 paratopotypes were collected 2 MILES NORTHEAST OF BLUFF, UTAH, 14 July 1967 by S. C. Williams, M. A. Cazier, and J. Davidson. The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is here named *V. utahensis* after the state, Utah, in which it was first collected.

In addition to the holotype, allotype and 30 paratopotypes, 83 other paratypes were collected from the following two localities in Utah (U.S.A.), San Juan Co.: ½ mile west of town of Bluff, 14 July 1967 (S. C. Williams, M. A. Cazier, J. Davidson), 46 males, 20 females; Bluff city limits, in flood plain of San Juan River, 14 July 1967 (S. C. Williams, M. A. Cazier, J. Davidson), 9 males, 8 females.

This species is a burrowing form found in fine textured sandy soils in a dune type community. Plants were low growing and sparse in the areas most abundantly occupied. The specimens collected were primarily older individuals, young instars were conspicuously uncom-

mon in the samples. The 115 specimens examined were collected during early evening on the ground surface by means of ultraviolet detection. This was interesting because of the occurrence of an electrical storm and intermittent light showers at the time of collection.

This species occurred in sandy habitats where the sand was fine textured and packed and was absent in areas where the sand was coarse and unpacked. Lower areas along the San Juan River flood plain were not occupied. This was the only species found in the Bluff, Utah area even though six different localities were sampled.

***Vejovis gertschi* Williams, new species**

(Figs. 3, 4)

DIAGNOSIS.—Small dark species of *Vejovis* closely related to *Vejovis wupatkiensis* Stahnke. Base color of cuticle brownish-yellow with contrasting dark or dusky markings on most body regions; inferior median and inferior lateral keels of metasoma underlined with dark pigmentation; terminal segments of metasoma darker than preceding segments. Carapace with anterior margin somewhat concave and with median emarginate notch; inferior median and inferior lateral keels of metasoma all distinctly developed, these serrate, crenulate or intermediate; pectinal teeth 16–18 in males, 14–16 in females; chela elongate, palm with crenulate keels medially and smooth keels dorsally and laterally, fixed finger longer than palm, terminal tooth on each finger elongate; chelicerae with inferior border of movable finger smooth.

May be distinguished from *V. wupatkiensis* in the following ways: palms without granulated keels on superior aspect; pedipalp fingers not more than twice the underhand length (may reach twice underhand length, however); movable finger of pedipalp not distinctly longer than metasoma V, but essentially the same length or less; distinctly smaller species; has more or less dark obsolescent stripes on dorsum of mesosoma; most of body with dark markings.

HOLOTYPE MALE.—*Coloration*.—Base color of body brownish-yellow, lighter on legs and venter than on dorsum; carapace with dark dusky pigmentation forming marbled pattern; one pair of obsolescent submedian dark stripes on dorsum of mesosoma, sternites without contrasting pigmentation; diffuse dark pigment underlying much of cuticle of metasomal segments and telson; inferior median and inferior lateral keels of metasoma underlined with dark diffuse pigment; telson with one pair of submedian ventral yellow stripes and one similar pair laterally; pedipalps and walking legs with much of cuticle marked with dusky pigmentation; pectines whitish except for some localized, dusky markings on anterior and middle lamellae; keels on palm of pedipalp outlined with dusky pigment, this extending into proximal region of fingers; ocular tubercule black, articulation point of legs reddish, aculeus reddish-brown, pretarsal claws light red.

Carapace.—Anterior margin concave, with distinct median notch, this border set with six reddish bristles; anterior border $\frac{1}{2}$ width of posterior border; lateral eyes three per group. Median eyes on raised ocular tubercule; one large bristle

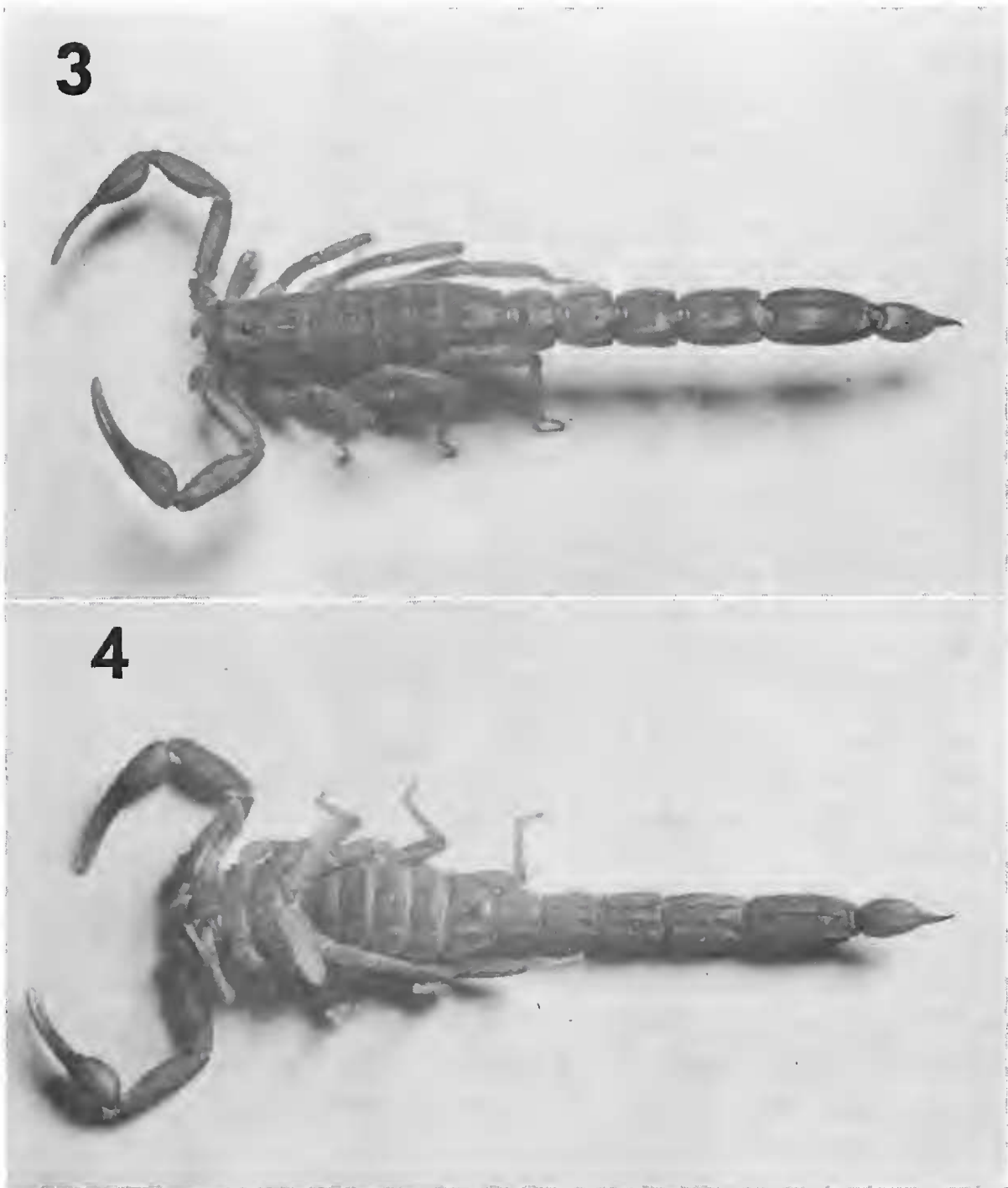


FIG. 3. *Vejovis gertschi* Williams, new species. Dorsal view of holotype. FIG. 4. *Vejovis gertschi* Williams, new species. Ventral view of holotype.

on tubercle behind each eye; diad slightly more than $\frac{1}{5}$ carapace width at that point. Carapace surface densely but irregularly covered with fine granules.

Mesosoma.—Tergites densely covered with fine granules; median keels reduced on tergites 1 and 2, but well developed and crenulate on other tergites; one pair lateral keels absent on tergite 1, reduced on 2, granular on 3 to 6, tergite 7 with two pairs of serrate lateral keels. Sternites smooth and lustrous, last sternite with one well developed pair of crenulate to serrate keels.

Metasoma.—Dorsal keels sharply serrate on segments I to IV, ending posteriorly on each segment in a distinctly larger tooth; all dorsal intercarinal spaces with small granules. Dorsal lateral keels serrate, crenulate or intermediate on segments

I to V. Lateral keels serrate to crenulate on posterior $\frac{5}{6}$ of segment I, posterior $\frac{1}{2}$ of II and on posterior $\frac{1}{4}$ of III, absent on IV, crenulate to granulate on anterior $\frac{5}{6}$ of V. Inferior lateral keels well developed and crenulate to serrate on all segments. Inferior median keels well developed on all segments, these crenulate on segments I and II, crenulate to serrate on III and IV, serrate on V. Inferior intercarinal spaces agranular. Inferior median keels of segments I to IV set with reddish bristles, 3, 3, 3, 2 pairs respectively; inferior intercarinal space of V with three pairs of reddish bristles. Segments I and II each wider than long, segment III as wide as long, segments IV and V each longer than wide; segment V slightly longer than combined length of segments I and II.

Telson.—Ventral side of vesicle with about seven pairs of reddish hairs; ventral side of vesicle with broad shield-like granules giving uneven surface texture. Distinct broad subaculear tubercle and well curved aculeus.

Pectines.—Appearing to have middle lamellae with 10 subcircular sclerites in a single row; triangular fulcra; 17 teeth per comb; each sclerite of middle lamella with 1 to 3 brownish-red hairs; each fulcrum with about 2 hairs.

Genital Operculum.—Completely divided longitudinally; genital papillae well developed and visible externally. Surface of genital operculum with six pairs of reddish hairs.

Pedipalps.—Palm only slightly swollen, hand elongate; crenulate keels on medial aspect of palm, the other keels of palm also well developed but quite smooth. Fixed finger much longer than palm, movable finger same length as carapace. Opposing margins of fingers without pronounced scalloping; distal tooth of each finger strikingly elongate.

Chelicerae.—Inferior border of movable finger smooth, completely lacking denticles.

Standard Measurements.—Table 2.

ALLOTYPE FEMALE.—Coloration and morphology essentially as holotype with following exceptions: slightly greater total length; slightly wider carapace and mesosoma; chela slightly longer and more elongate; pectines with fewer teeth (14/15 instead of 17/17); middle lamellae composed of fewer sclerites (9 instead of 10); cuticle somewhat more lustrous; movable finger slightly longer than carapace.

Standard Measurements.—Table 2.

Paratypes showed little significant variation from the descriptions of the holotype and allotype. Males varied from 0.7 to 3.0 millimeters in carapace length while females varied from 0.7 to 3.5 millimeters in this length. Pectine tooth count varied from 16 to 18 in males, and from 14 to 16 (predominantly 15) in females. Adult females reached slightly larger body sizes than adult males. Both sexes had body parts with essentially the same proportions except that adult females had a wider carapace and longer mesosoma. The movable pedipalp finger, carapace and metasomal segment V all had essentially the same lengths, but varied in that any one of these body parts could be longer depending upon the individual being measured. All specimens were characteristically dark, but some were somewhat darker than others. The

TABLE 2. Measurements (in millimeters) of *Vejovis gertschi*, new species, holotype and allotype.

| | Holotype (male) | Allotype (female) |
|-----------------------------|--------------------|----------------------|
| Total length | 23.0 | 25.2 |
| Carapace, length | 3.1 | 3.2 |
| width (at median eyes) | 2.3 | 2.5 |
| Mesosoma, length | 5.9 | 7.4 |
| Metasoma, length | 11.0 | 11.3 |
| segment I, length/width | 1.4/1.9 | 1.4/2.0 |
| segment II, length/width | 1.7/1.9 | 1.8/2.0 |
| segment III, length/width | 1.9/1.9 | 1.9/1.9 |
| segment IV, length/width | 2.5/1.8 | 2.6/1.9 |
| segment V, length/width | 3.5/1.8 | 3.6/1.8 |
| Telson, length | 3.0 | 3.3 |
| Vesicle, length/width | 2.0/1.2 | 2.1/1.2 |
| depth | 0.8 | 0.9 |
| Aculeus, length | 1.0 | 1.2 |
| Pedipalp | | |
| Humerus, length/width | 2.8/0.8 | 3.0/0.9 |
| Brachium, length/width | 3.1/1.0 | 3.3/1.1 |
| Chela, total length | 4.7 | 5.3 |
| Palm, length/width | 2.0/1.0 | 2.3/1.1 |
| depth | 1.1 | 1.2 |
| Fixed finger, length | 2.7 | 3.0 |
| Movable finger, length | 3.1 | 3.4 |
| Pectines, teeth, left/right | 17/17 | 14/15 |
| middle lamellae | 10 | 9 |

stripes on the mesosoma were much more pronounced on some specimens but always obsolescent. The specimen from Wildcat Canyon was so dark that color patterns were obscured, but this darkness was probably due to poor preservation. Most specimens had the terminal segments of the metasoma distinctly darker than the preceding ones.

First instars were distinct in that: aculeus blunt; pretarsal claws absent; base color white, but with contrasting dusky markings.

The *holotype male*, allotype and 21 paratopotypes were collected ONE MILE EAST OF SAN YSIDRO, SAN DIEGO COUNTY, CALIFORNIA, 31 December 1966 (S. C. Williams). All specimens were collected during the day under rocks and cardboard on a coastal chaparral hillside. The holotype and allotype are permanently deposited in the California Academy of Sciences.

In addition to the holotype, allotype and 21 paratopotypes, an additional 47 paratypes were studied. Paratypes were collected from

the following localities in San Diego County, California (U.S.A.): Otay River Valley, on Otay Ranch, 31 December 1966 (S. C. Williams), 9 males, 13 females; Otay Valley, 10 November 1963, (Benny Nava), 2 males, 1 female; Wildcat Canyon, 5 miles north of town of Lakeside, 9 June 1962 (S. C. Williams), 1 female; Alvarado Canyon, San Diego city, 6 April 1957 (S. C. Williams), 7 females; Alvarado Canyon, San Diego city, 29 December 1963 (S. C. Williams), 1 female and 12 first instars (babies were not born until July 1964); San Diego city, 24 January 1965 (Susie Kasal), 1 female.

This species appears to be one of the more common species in coastal San Diego county, California. Most of the specimens were collected under rocks and other surface cover, but they also appear to be common under flakes of heat fractured granite rocks. In Otay Valley, 12 specimens were removed from an active wood rat (*Neotoma* sp.) nest. In the Wildcat Canyon study area, the specimen was collected in a pit-trap in a chaparral community recovering from a recent fire.

Notes on the Biology of *Eucrossus villicornis* LeConte

(Coleoptera : Cerambycidae)

BOYD E. WICKMAN¹ AND SERJE G. SEMINOFF²

*Pacif. SW Forest and Range Exp. Sta., Forest Serv.,
USDA, Berkeley, Calif.*

Eucrossus villicornis LeConte, a wood borer, has been found in California, Nevada, Arizona, New Mexico, and northern Mexico on *Pinus* spp., including *P. jeffreyi* Grev. & Balf. (Linsley, 1962). It is usually active from April to September. *Eucrossus* LeConte is monotypic in the subfamily Cerambycinae. Craighead (1923) reared specimens of *E. villicornis* LeConte at Falls Church, Virginia, from *P. torreyana* Parry collected at San Diego, California. He states: "The work [of the insect] resembles that of *Callidium antennatum*." But it is not clear whether he meant the resemblance applied to all of the boring activity or only part of it. Perhaps our observations can clarify this point.

In summer of 1965 we reared *E. villicornis* from *P. jeffreyi* logs at Hat Creek, California. The logs had been cut in fall of 1964 near Idlewild, Riverside County, California, from trees infested with *Melanophila californica* Van Dyke (Swain and Wickman, 1968). They had

¹ Present address: Pacific NW Forest & Range Exp. Sta., Corvallis, Ore.

² Present address: Camino, Calif.